

APPENDIX C: TABLES

**WEBB
TRACT**

Elevation (Feet)	Cumulative Volume (Acre-Feet)	Surface Area (Acres)
		5390
4	100,664	5374
2	89,884	5359
0	79,150	5343
-2	68,486	5328
-4	57,933	5312
-6	47,551	5296
-8	37,442	5097
-10	27,837	4839
-12	18,938	4305
-14	11,084	3767
-16	4,888	2939
-18	1,230	1299
-20	146	190
-22	0	0

**BACON
ISLAND**

Elevation (Feet)	Cumulative Volume (Acre-Feet)	Surface Area (Acres)
		5467
4	114,965	5450
2	100,527	5433
0	86,130	5415
-2	71,845	5398
-4	57,584	5380
-6	43,600	5363
-8	30,346	5345
-10	18,707	5301
-12	9,603	3736
-14	4,031	2253
-16	976	1037
-18	87	154
-20	0	0

**VICTORIA
ISLAND**

Elevation (Feet)	Cumulative Volume (Acre-Feet)	Surface Area (Acres)
		7118
4	107,978	7102
2	93,482	7082
0	79,072	7060
-2	64,354	6995
-4	49,190	6832
-6	34,138	6565
-8	20,601	6438
-10	10,800	5840
-12	4,080	5100
-14	12	20
-16	0	0

Table 2a
Webb Tract, 100-yr Flood Height and Wave Run up

S t a t i o n	F e t c h L e n g t h (ft)	W a v e R u n u p (ft)	B a s e * F l o o d (ft)
0 + 0 0	-	-	-
1 + 0 0	8 5 0	2 . 1	6 . 7
1 0 + 0 0	9 0 0	2 . 1	6 . 7
2 0 + 0 0	8 0 0	2 . 0	6 . 7
3 0 + 0 0	1 , 1 5 0	2 . 4	6 . 8
4 0 + 0 0	1 , 2 5 0	2 . 5	6 . 8
5 0 + 0 0	8 0 0	2 . 0	6 . 8
6 0 + 0 0	8 5 0	2 . 1	6 . 8
7 0 + 0 0	1 4 , 8 5 0	7 . 7	6 . 8
8 0 + 0 0	1 4 , 4 5 0	7 . 6	6 . 8
9 0 + 0 0	1 4 , 9 0 0	7 . 7	6 . 9
9 9 + 8 3	1 5 , 6 5 0	7 . 9	6 . 9
1 1 0 + 0 0	1 5 , 6 0 0	7 . 9	6 . 9
1 2 0 + 0 0	1 6 , 7 5 0	8 . 2	6 . 9
1 3 0 + 0 0	1 4 , 8 0 0	7 . 7	6 . 9
1 4 0 + 0 0	1 4 , 4 5 0	7 . 6	7 . 0
1 4 9 + 0 0	1 3 , 7 5 0	7 . 4	7 . 0
1 6 0 + 0 0	1 0 , 4 5 0	6 . 5	7 . 0
1 7 0 + 0 0	7 , 6 3 0	5 . 6	7 . 0
1 8 0 + 0 0	7 , 9 0 0	5 . 7	7 . 0
1 9 0 + 0 0	8 , 9 5 0	6 . 0	7 . 0
2 0 0 + 0 0	7 , 3 0 0	5 . 5	7 . 1
2 1 0 + 0 0	5 , 4 0 0	4 . 8	7 . 1
2 2 0 + 0 0	1 , 5 5 0	2 . 7	7 . 1
2 3 0 + 0 0	1 , 9 5 0	3 . 0	7 . 1
2 4 0 + 0 0	1 , 8 0 0	2 . 9	7 . 1
2 5 0 + 0 0	1 , 5 0 0	2 . 7	7 . 1
2 6 0 + 0 0	1 , 4 5 0	2 . 6	7 . 1
2 7 0 + 0 0	1 , 2 0 0	2 . 4	7 . 1
2 8 0 + 0 0	3 0 0	1 . 4	7 . 1
2 9 0 + 0 0	0	0 . 0	7 . 0
3 0 0 + 0 0	0	0 . 0	7 . 0
3 1 0 + 0 0	0	0 . 0	7 . 0
3 2 0 + 0 0	0	0 . 0	7 . 0
3 3 0 + 0 0	0	0 . 0	7 . 0
3 4 0 + 0 0	0	0 . 0	7 . 0
3 5 0 + 0 0	3 , 5 5 0	3 . 9	7 . 0
3 6 0 + 0 0	3 , 4 0 0	3 . 8	7 . 0
3 7 0 + 0 0	3 , 4 5 0	3 . 9	7 . 0
3 8 0 + 0 0	3 , 6 5 0	4 . 0	6 . 9
3 9 0 + 0 0	3 , 7 0 0	4 . 0	6 . 9
4 0 0 + 0 0	3 , 0 5 0	3 . 6	6 . 9
4 1 0 + 0 0	3 , 2 5 0	3 . 8	6 . 9
4 2 0 + 0 0	3 , 1 0 0	3 . 7	6 . 9
4 3 0 + 0 0	3 , 0 5 0	3 . 6	6 . 9
4 4 0 + 0 0	3 , 7 5 0	4 . 0	6 . 8
4 5 0 + 0 0	3 , 8 0 0	4 . 0	6 . 8
4 6 0 + 0 0	2 , 5 0 0	3 . 3	6 . 8
4 7 0 + 0 0	1 , 8 5 0	2 . 9	6 . 8
4 8 0 + 0 0	2 , 0 0 0	3 . 0	6 . 8
4 9 0 + 0 0	2 , 9 0 0	3 . 6	6 . 8
5 0 0 + 0 0	3 , 1 5 0	3 . 7	6 . 7
5 1 0 + 0 0	3 , 2 0 0	3 . 7	6 . 7
5 2 0 + 0 0	2 , 9 0 0	3 . 6	6 . 7
5 3 0 + 0 0	2 , 5 5 0	3 . 4	6 . 7
5 4 0 + 0 0	1 , 9 5 0	3 . 0	6 . 7
5 5 0 + 0 0	1 , 9 0 0	3 . 0	6 . 6
5 6 0 + 0 0	2 , 3 5 0	3 . 2	6 . 6
5 7 0 + 0 0	2 , 7 0 0	3 . 5	6 . 6
5 8 0 + 0 0	3 , 8 5 0	4 . 1	6 . 6
5 9 0 + 0 0	1 , 0 5 0	2 . 3	6 . 6
6 0 0 + 0 0	1 , 2 0 0	2 . 4	6 . 6
6 1 0 + 0 0	5 5 0	1 . 8	6 . 6
6 2 0 + 0 0	4 5 0	1 . 6	6 . 6
6 3 0 + 0 0	3 0 0	1 . 4	6 . 7
6 4 0 + 0 0	3 5 0	1 . 5	6 . 7
6 5 0 + 0 0	3 5 0	1 . 5	6 . 7
6 6 0 + 0 0	3 5 0	1 . 5	6 . 7
6 7 0 + 0 0	4 0 0	1 . 6	6 . 7
6 8 0 + 0 0	4 0 0	1 . 6	6 . 7
6 8 2 + 4 4	-	-	-

Base Flood = 100-year Flood Elevation

Table 2b
Bacon Island, 100-yr Flood Height and Wave Run up

Station	Fetch Length (ft)	Wave Runup (ft)	Base * Flood (ft)
0+00	-	-	-
1+00	700	1.9	7.3
10+00	1,500	2.7	7.3
20+00	1,000	2.2	7.3
30+00	1,100	2.3	7.3
40+00	1,000	2.2	7.3
50+00	0	0.0	7.3
60+00	0	0.0	7.3
70+00	550	1.8	7.3
80+00	500	1.7	7.3
90+00	1,000	2.2	7.3
100+00	1,600	2.7	7.3
110+00	600	1.8	7.3
111+00	750	2.0	7.3
112+00	250	1.3	7.3
113+00	250	1.3	7.3
114+00	250	1.3	7.3
115+00	250	1.3	7.3
116+00	250	1.3	7.3
117+00	250	1.3	7.3
118+00	250	1.3	7.3
119+00	250	1.3	7.3
120+00	300	1.4	7.3
121+00	400	1.6	7.2
122+00	500	1.7	7.2
123+00	500	1.7	7.2
124+00	500	1.7	7.2
125+00	500	1.7	7.2
126+00	500	1.7	7.2
127+00	400	1.6	7.2
128+00	350	1.5	7.2
129+00	600	1.8	7.2
130+00	800	2.0	7.2
131+00	1,100	2.3	7.2
132+00	1,300	2.5	7.2
133+00	1,400	2.6	7.2
134+00	1,700	2.8	7.2
135+00	500	1.7	7.2
136+00	950	2.2	7.2
137+00	400	1.6	7.2
138+00	600	1.8	7.2
139+00	550	1.8	7.2
140+00	500	1.7	7.2
141+00	550	1.8	7.2
142+00	500	1.7	7.2
143+00	500	1.7	7.2
144+00	500	1.7	7.2
145+00	550	1.8	7.2
146+00	550	1.8	7.2
147+00	550	1.8	7.2

Station	Fetch Length (ft)	Wave Runup (ft)	Base * Flood (ft)
148+00	500	1.7	7.2
149+00	500	1.9	7.2
150+00	500	2.7	7.2
151+00	500	2.2	7.2
152+00	0	0.0	7.2
153+00	0	0.0	7.2
154+00	0	0.0	7.2
155+00	0	0.0	7.2
156+00	0	0.0	7.2
157+00	0	0.0	7.2
158+00	0	0.0	7.2
159+00	1,300	2.7	7.2
160+00	1,300	1.8	7.2
161+00	1,400	2.0	7.2
162+00	1,450	1.3	7.2
163+00	1,500	1.3	7.2
164+00	1,500	1.3	7.2
165+00	1,400	1.3	7.2
166+00	1,100	1.3	7.2
167+00	800	1.3	7.2
169+00	700	1.3	7.2
170+00	600	1.3	7.2
171+00	550	1.4	7.2
172+00	550	1.6	7.2
173+00	500	1.7	7.2
174+00	500	1.7	7.2
175+00	500	1.7	7.2
176+00	450	1.7	7.2
177+00	450	1.7	7.2
178+00	450	1.6	7.2
179+00	450	1.5	7.2
180+00	450	1.8	7.2
190+00	200	2.0	7.2
200+00	200	2.3	7.2
210+00	350	2.5	7.2
220+00	500	2.6	7.2
230+00	600	2.8	7.2
240+00	400	1.7	7.2
250+00	1,100	2.2	7.2
260+00	450	1.6	7.1
270+00	1,600	1.8	7.1
280+00	400	1.8	7.1
290+00	500	1.7	7.1
300+00	600	1.8	7.1
310+00	200	1.7	7.1
320+00	1,200	1.7	7.1
330+00	200	1.7	7.1
340+00	1,400	1.8	7.1
350+00	450	1.8	7.1
360+00	600	1.8	7.1

Station	Fetch Length (ft)	Wave Runup (ft)	Base * Flood (ft)
370+00	200	1.2	7.1
380+00	900	1.9	7.1
390+00	300	2.7	7.1
400+00	150	2.2	7.2
410+00	800	2.3	7.2
420+00	700	2.2	7.2
430+00	600	1.2	7.2
440+00	500	1.2	7.2
450+00	525	1.8	7.2
460+00	525	1.7	7.2
461+00	525	2.2	7.2
462+00	525	2.7	7.2
463+00	525	1.8	7.2
464+00	525	2.0	7.2
465+00	525	1.3	7.2
466+00	525	1.3	7.2
467+00	525	1.3	7.2
468+00	525	1.3	7.2
469+00	525	1.3	7.2
470+00	525	1.3	7.2
480+00	250	1.3	7.2
490+00	700	1.3	7.2
500+00	600	1.4	7.2
510+00	600	1.6	7.2
520+00	600	1.7	7.2
530+00	700	1.7	7.2
540+00	550	1.7	7.2
550+00	600	1.7	7.3
560+00	200	1.7	7.3
570+00	1,000	1.6	7.3
580+00	300	1.5	7.3
590+00	300	1.8	7.3
600+00	400	2.0	7.3
610+00	1,400	2.3	7.3
620+00	800	2.5	7.3
630+00	300	2.6	7.3
640+00	300	2.8	7.3
650+00	300	1.7	7.4
660+00	300	2.2	7.4
670+00	300	1.6	7.4
680+00	300	1.8	7.4
690+00	300	1.8	7.4
700+00	800	1.7	7.4
710+00	1,200	1.8	7.4
720+00	500	1.7	7.4
730+00	500	1.7	7.4
740+00	600	1.7	7.4
750+00	550	1.8	7.3
756+36	-	-	-

* Base Flood = 100-year Flood Elevation

Table 3. Delta Wetlands Assumed Borrow Requirements (from 2001 EIS, Table 3D-4)

Island	Borrow Quantity, cubic yards	Borrow Site Configuration		
		Depth, feet	Total area, acres	Average Size, acres
Bacon Island	330,000	5	41	10
Webb Tract	410,000	5	51	10
Total for Alt. 1*	4,180,000	5	405	10

* Includes interior dikes and modification of levees on Bouldin Island and Holland Tract

Table 4. URS Estimation of Wave Runup, Setup and Crest Elevation

	Bacon Island		Webb Tract	
	5:1 slope	3:1 slope	5:1 slope	3:1 slope
Wave runup without riprap (feet)	4.0	6.4	3.8	6.1
Wave runup with riprap (feet)	2.2	3.5	2.1	3.4
Reservoir setup (feet)	0.4	0.4	0.3	0.3
Crest elevation, reservoir at El. 4	6.6	7.9	6.4	7.7

Table 5. - Minimum Factors of Safety

CASE	MATERIAL PROPERTIES	PHREATIC SURFACE	MINIMUM FACTOR OF SAFETY			
			USACE levee	DWR	USBR	use
End of Construction	Unconsolidated undrained shear strength	Construction-induced excess pore pressures with high and low river elevations	1.3	1.3	1.3	1.3
Sudden Drawdown	Consolidated undrained shear strength	Rapid drawdown from normal pool to dead storage with low river elevation (use phreatic surface from steady-state seepage with surface following the island slope.	1.0	1.25	1.3	1.2
Steady-state Seepage	Consolidated drained strength	Steady-state seepage under normal pool with low river elevation	1.4*	1.5**	1.5	1.5
Post-liquefaction Stability	Based on SPT	Steady-state	1.0	1.0	1.2	1.1

* Nonproject Delta Levees per PL84-99, factor of safety is 1.25

** California DWR Delta Levees (1989b), factor of safety is 1.3

Table 6. - Webb Tract - Existing Levee Configurations

VARIABLE	AVERAGE	MAX	MIN	MEDIAN	Std. DEV.	Delta Wetlands	
						Sta. 160*	Sta. 630*
Crest Elevation	8.5	10.7	7.3	8.3	0.7	8.3	7.5
Crest Width, feet	19.2	28.7	12.5	18.2	3.6	17.7	28
Height of Levee, feet ¹	18.3	22.1	9.2	18.5	2.6	18.8	19.5
Water Side Slope ²	2.6	4.2	1.4	2.5	1.3	2.8	2.5
Upper Land Side Slope ³	3.8	12.8	1.6	3.2	2.2	2.7	2.8
Lower Land Side Slope ⁴	12.7	39.0	0	11.8	9.1	10.5	16.7
Thickness of Peat, feet ⁵	26.8	40	10	30	8	30	10
Channel Elevation	-25	-41	-13	-25	5.9	28	25

*Specific cross section not available in CALFED data so averaged adjacent sections

¹Height of Levee - crest elevation minus the approximate elevation of the island at the toe.

²Water side slope - slope from crest elevation 0.

³Upper landside slope - slope from crest to first noticeable break in the slope.

⁴Lower landside slope - slope from first noticeable slope break to the next

⁵Thickness of peat taken from 1998 CALFED study which used Organic material depths from the Department of Water Resources' map entitled, "Organic Isopach Map", October 18, 1976.

Table 7. - Bacon Island - Existing Levee Configurations

VARIABLE	AVERAGE	MAX	MIN	MEDIAN	STdev	Sta. 25*	Sta. 265*
Crest Elevation	8.2	10.9	6.6	8.0	0.6	8.1	8.1
Crest Width, feet	26.3	56.4	9.8	26.4	7.6	26.9	18.1
Height of Levee, feet ¹	16.8	25.5	7.0	17.5	3.4	15.5	19.7
Water Side Slope ²	2.7	15.0	1	2.4	1.4	2.5	2.6
Upper Land Side Slope ³	3.7	17.4	1	3.0	2.6	2.8	4.0
Lower Land Side Slope ⁴	9.3	43.3	0	7.4	3.5	9.1	24.2
Thickness of Peat, feet ⁵	14	20	10	10	5	10	15

*Specific cross section not available in CALFED data so averaged adjacent sections

¹Height of Levee - crest elevation minus the approximate elevation of the island at the toe.

²Water side slope - slope from crest elevation 0.

³Upper landside slope - slope from crest to first noticeable break in the slope.

⁴Lower landside slope - slope from first noticeable slope break to the next

⁵Thickness of peat taken from 1998 CALFED study which used Organic material depths from the Department of Water Resources' map entitled, "Organic Isopach Map", October 18, 1976.

Table 8. - Typical Configurations for Analysis

VARIABLE	1	2	3	4	5	6	7	8
Height, feet	10	10	10	24	24	24	16	16
Water Side Slope, H:V	3:1	2:1	2:1	3:1	2:1	2:1	2:1	2:1
Land Side Slope, H:V	4:1	4:1	4:1	4.5:1	4:1	4:1	4:1	3.5:1
Thickness of Peat, feet	10	20	40	10	20	40	20	30
New Crest Elevation	10	10	10	10	10	10	15	15

Table 9. Material Properties

Material	Weight γ , lb/ft ³		Unconsolidated Undrained Strength		Consolidated Drained Strength		Consolidated Undrained Strength	
	Wet	Sat.	C lb/ft ²	ϕ , degrees	C', lb/ft ²	ϕ' degrees	C', lb/ft ²	ϕ' , degrees
New fill	110 (120)	120 [115]	0	30	0 (0) [0]	30 (34) [35]	0	30
Existing fill, sand	(110)	110	0	30	0 (0)	30 (32)	0	30
Existing fill, sand with clay and peat	(110) [105] {115}	110 {130}	0 (135)	30 (12)	0 (80) [0] {0}	30 (27) [35] {30}	0	30
Peat under dam @ centerline		70 [70] {83}	50-1500 (135) [100-300]	0 (12) [0]	50 (50) [50] {50}	28 (28) [30] {19}	100	15
Free field peat	(70)	70	250 (135) [100-300]	0 (12)	50 (50)	26 (26)	100	15
Deep sand	-	125 [125] {125}	-	-	0 [0] {0}	36 [37] {40}	0	36
Gray fat clay	-	85	200-300 [200-300]	0 [0]	0 [100]	25 [30]	100	30

() values used by URS Greiner Woodward Clyde in the July 2000 EIR Review report.

[] values used by Harding and Lawson in the 1989 study.

{ } values used by State of California in the 1990 Levee Rehabilitation study

Table 10. Water Levels Used in Stability Analysis

Condition	Water Elevation (ft)		Direction of Failure Surface
	River/slough	Island	
Existing	(6)* (0)	(-16) (-16)	Island River/slough
End of construction	0 and 6 (2 and 6)	GS** (-16)	Island River/slough
Steady-state seepage	6 (6) 0 (0)	GS (-14) 4 (6)	Island River/slough
Sudden drawdown	6 (0) 0	GS (-14) (6)	Island River/slough
Seismic	(2) 0 (0)	(-14) 4 (6)	Island River/slough

* Numbers in brackets are the values used in the URS [] study.

** GS = 2 feet below ground surface

Table 11. Factors of Safety from Harding and Lawson Associates Analysis (1989)

Island Profile	Existing Condition		After Construction		Long-term	
	Slough	Island	Slough	Island	Slough	Island
Bacon #3 (Sta. 265)	1.6	1.2	1.5	1.6	1.6	1.8
Bacon #4 (Sta. 25)	2.0	1.5	1.7	2.4	1.7	2.5
Webb #7 (Sta. 160)	1.4	1.4	1.3	1.6	1.4	1.8
Webb #8 (Sta. 630)	1.5	2.0	1.4	3.1	1.4	5.3
Design Criteria	n/a	n/a	1.3	1.3	1.5	1.5

Table 12. Factors of Safety from URS Greiner Woodward Clyde Analysis (2000)

Island Profile	Existing Condition		End of Construction		Long-term		Sudden Drawdown	
	Slough	Island	Slough	Island	Slough	Island	Slough	Island
Bacon Sta. 25+00	1.48	1.23	1.48	0.9	1.33	1.63	1.33	1.07
Bacon Sta.265+00	1.49	1.21	1.49	0.86	1.23	1.64	1.23	0.98
Webb Sta.160+00	1.29	1.24	1.29	0.62	1.12	1.57	1.12	0.88
Webb Sta.630+00	1.34	1.40	1.34	0.89	1.12	1.82	1.12	1.18
Webb * Sta.630+00	-	-	-	1.22	1.12	1.71	-	1.04
Design Criteria	n/a	n/a	1.3	1.3	1.5	1.5	1.2	1.2

* new fill has 3:1 slope flattening to 10:1 at elevation -3.

Table13. USBR/DWR Factors of Safety for Steady-state Condition and Sliding Towards River/Slough

Slope (H:V) above Elevation 0	Peat Strength free field//under dam//cohesion (phi//phi//psf)	Factor of Safety* 10' embankment				Factor of Safety* 18' embankment			
		10' peat		30' peat		10' peat		30' peat	
2:1	30//0	.95	1.55	.95		1.24		1.14	
3:1	30//0	1.13		1.04		1.37		1.19	
4:1	30//0	1.33	1.54	1.13		1.51		1.24	
2:1	26//28//50	1.19	1.68	1.16	1.28	1.43	1.65	1.25	1.31
3:1	26//28//50	1.31	1.88	1.24	1.39	1.51	1.79	1.29	1.35
4:1	26//28//50	1.56	2.34	1.39	1.64	1.73	2.29	1.43	1.59
2:1	15//19//100	1.2		1.08		1.36		1.1	
3:1	15//19//100	1.28		1.12		1.43		1.17	
4:1	15//19//100	1.46		1.17		1.53		1.22	

* Where there are two values reported, the first value is the factor of safety that takes out only a portion of the crest and the other factor of safety is for a sliding surface that includes the entire crest.

Table 14. USBR/DWR Factors of Safety for Steady-state Condition and Sliding Towards Island

	1	2	3	4	5	6	7	8
Height of Existing Embankment, feet	10	10	10	24	24	24	16	16
Thickness of peat, feet	10	20	40	10	20	40	20	30
New Crest Elevation	10	10	10	10	10	10	15	15
Factor of Safety	1.75	1.41	1.26	2.71	1.96	1.49	1.67	1.46

Assumes existing slope is approximately 4:1, new slope is 3:1 to elevation +4 and then 10:1, slough side slope is cut back to 4:1, and a new crest width of 35 feet, reservoir empty and river at elevation +6.

Table 15. USBR/DWR Factors of Safety for Post Liquefaction Condition and Sliding Towards River/Slough

Liquefied Strength, psf	Factor of Safety* 10' embankment		Factor of Safety* 18' embankment	
	10' peat	30' peat	10' peat	30' peat
100	0.93	1.11	0.91	1.04
200	1.21	1.29	1.20	1.22
400	1.58	1.40	1.70	1.43
no liquef.	1.56	1.39	1.73	1.43

* Assumed 4:1 slope on the river/slough side, water in the slough to elevation 0 , no water in the reservoir, free field peat strength assumed to be $c=50$ psf and $\phi = 26$, peat under embankment strength assumed to be $c=50$ psf and $\phi = 28$

Table16. USBR/DWR Factors of Safety for Post Liquefaction Condition and Sliding Towards Island

	1	2	3	4	5	6	7	8
Height of Existing Embankment, feet	10	10	10	24	24	24	16	16
Thickness of peat, feet	10	20	40	10	20	40	20	30
New Crest Elevation	10	10	10	10	10	10	15	15
Factor of Safety- no liquef.	1.80	1.41	1.26	2.71	1.96	1.49	1.67	1.46
Factor of Safety for 100 psf	1.21	1.0	1.02	1.23	1.06	0.98	0.98	0.92
Factor of Safety for 200 psf	1.55	1.21	1.16	1.49	1.24	1.07	1.17	1.06
Factor of Safety for 400 psf	2.16	1.43	1.26	1.97	1.56	1.26	1.49	1.32

Assumes existing slope is approximately 4:1, new slope is 3:1 to elevation 4 and then 10:1, slough side slope is cut back to 4:1, and a new crest width of 35 feet, reservoir empty and river at elevation 6.

Table 17. Values of Hydraulic Conductivity Used by URS

Material	Hydraulic conductivity	
	Horizontal, K_x [cm/s]	Vertical, K_y [cm/s]
Fill (Clay with Peat and Sand; Sand; Sand and Clay; Peat)	1×10^{-4}	1×10^{-5}
Fill (Clay)	1×10^{-6}	1×10^{-6}
Peat	1×10^{-4}	1×10^{-5}
Sand	1×10^{-3}	1×10^{-4}
Channel Silt	1×10^{-6}	1×10^{-6}
Upper Clay	1×10^{-6}	1×10^{-6}
Lower Clay	1×10^{-6}	1×10^{-6}
New Fill (Sand)	1×10^{-3}	1×10^{-3}

Table 18. Estimated Peat Settlement, feet [Harding Lawson Associates]

PEAT THICKNESS (feet)	HEIGHT OF FILL (feet)		
	5	10	15
	ESTIMATED PEAT SETTLEMENT (feet)		
5	1.5	2.5	3.0
10	3.0	5.0	7.0
15	5.0	8.0	11.0
20	7.0	11.5	15.0

Table 19. Integrated Facility Gate and Valve Operation

Condition	Method	Gate #1	Gate #2	Valves on Intake/Discharge Conduit	
				Reservoir Side	River Side
Diversion	Pumped	Open	Closed	Open	Closed
Diversion	Gravity	Open	Open	Open	Closed
Release	Pumped	Closed	Open	Closed	Open
Release	Gravity	Open	Open	Open	Open

TABLE 20. Gate Design Data and Dimensions

FACILITY	DESIGN FLOW RATE	MAX. HEAD DIFFERENCE BETWEEN RIVER AND RESERVOIR	GATE OPENING (d) BASED ON		FINAL DESIGN GATE HEIGHT
			Equation 1	Equations 2 and 3	
	(cfs)	(ft)	(ft)	(ft)	(ft)
Webb Tract – San Joaquin River	1,500	21	1.9	6.5	8
Bacon Island – Middle River	1,500	22	1.8	6.5	8
Victoria Island – Middle River	1,500	18	2.0	6.5	8
Webb Tract – False River	1,500	21	1.5	5.2	7
Bacon Island _ Santa Fe Cut	1,500	22	1.5	5.2	7
Victoria Island – Old River	1,500	18	1.6	5.2	7

(Note: Number of Bays or Gate Sections = 3; Clear Width of Each Gate Section = 12 ft.)

Table 21. Low Pool and Bypass Dimensions and Settings

FACILITY	LOW POOL BOTTOM		BYPASS AT DOWNSTREAM END	
	SIZE (FT)	ELEVATION (FT)	WIDTH (FT)	ELEVATION (FT)
Webb Tract – San Joaquin River	120 X 150	-24.0	130	-15.5
Bacon Island – Middle River	120 X 150	-24.0	130	-14
Victoria Island – Middle River	120 X 150	-20.5	130	-6
Webb Tract – False River	120 X 150	-24.0	130	-14
Bacon Island – Santa Fe Cut	120 X 150	-24.0	130	-8
Victoria Island – Old River	120 X 150	-20.5	130	-8

Table 22. Total Dynamic Head and Installed Capacity of the Integrated Facilities

Facility Location	Design Flow	Head Loss in Trash Rack	Contraction loss:(flow from river to gated channel)	Misc. Minor Losses (Gate, Valve, Bend and Exit)	Pipe Friction Head Loss	Total Head Loss	Max. Water Surface Elev.-River or Resv.	Min. Water Surface Elev.-Low Pool	Max. Static Head	Total Dynamic Head	Installed Capacity Req'd.	Installed Capacity Req'd.
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(hp)	(mw)
Webb Tract – False River	1500	0.04	0.03	1.83	0.22	2.12	6.84	-14	21	23	4,499	3.4
Bacon Island – Santa Fe Cut	1500	0.04	0.03	1.83	0.22	2.12	7.30	-14.5	22	24	4,695	3.5
Victoria Island – Old River	1500	0.04	0.03	1.83	0.22	2.12	7.24	-11	18	20	3,912	2.9
Webb Tract – San Joaquin River	1500	0.04	0.03	1.83	0.22	2.12	6.84	-14	21	23	4,499	3.4
Bacon Island – Middle River	1500	0.04	0.03	1.83	0.22	2.12	7.30	-14.5	22	24	4,695	3.5
Victoria Island – Middle River	1500	0.04	0.03	1.83	0.22	2.12	7.30	-11	18	20	3,912	2.9

Table 23. Annual Operation and Maintenance Cost

Alternative	Activity										
	Embankment Maintenance	Integrated Facilities & Fish Screen Maintenance	Pump Operations	Seepage Control System	Habitat Island Monitoring and O&M	Fisheries Mitigation & Monitoring	Invasive Weed Control on Reservoir Islands	Recreation	Cultural Resources Mitigation	Property Taxes	Total O&M Cost
Re-Engineered Delta Wetlands	\$ 837,000	\$ 200,000	\$ 1,003,000	\$ 502,000	\$ 1,400,000	\$ 2,800,000	\$ 970,000	\$ 265,000	\$ 10,000	\$ 346,000	\$ 8,334,000
Bacon Island and Victoria Island with connection to Clifton Court	\$ 874,000	\$ 200,000	\$ 934,000	\$ 502,000	\$ 1,400,000	\$ 2,800,000	\$ 985,000	\$ 280,000	\$ 10,000	\$ 374,000	\$ 8,358,000
Webb Tract and Victoria Island with connection to Clifton Court	\$ 830,000	\$ 200,000	\$ 919,000	\$ 502,000	\$ 1,400,000	\$ 2,800,000	\$ 985,000	\$ 280,000	\$ 10,000	\$ 373,000	\$ 8,299,000

TABLE 24A. RE-ENGINEERED DELTA WETLANDS
PROJECT: INTEGRATED FACILITIES ON WEBB TRACT AND
BACON ISLAND - ESTIMATE OF QUANTITIES AND COSTS
FOR 1,500 CFS DIVERSION/RELEASE AT EACH
INTEGRATED FACILITY (TOTAL = 6,000 CFS MAX)
Assumes Slough Side Slopes will be modified to 3:1.

Item	Total Quantity	Units	Unit Price	Pricing	Notes & Comments
1. RELOCATIONS					
New Transmission Lines to Pumping Plants					
Webb Tract	6	MI	\$265,000	\$1,590,000	
Bacon Island	6	MI	\$265,000	\$1,590,000	
PG&E Relocation at Bacon Island		LS		\$9,200,000	
SUBTOTAL RELOCATIONS					\$12,380,000
2. INTEGRATED FACILITIES					
2.A Webb Tract- San Joaquin River, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)					
2.A.1 Pumping Plant(Q=1,500 cfs,TDH=23 ft,P=3.4 mw)	1	LS	\$9,000,000	\$9,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	21,700	CY	\$10	\$217,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	5,000	CY	\$5	\$25,000	
Dewatering		LS		\$1,000,000	
2.A.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	845,100	CY	\$8	\$6,761,000	
Riprap	98,000	TON	\$26	\$2,548,000	2.5-foot deep riprap layer
Bedding	20,200	CY	\$20	\$404,000	1-foot deep bedding layer
2.A.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.A.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.A.5 Control Building	400	SF	\$200	\$80,000	
2.A.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.A.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
2.B Webb Tract- False River, (Max. diversion = 1,500 cfs,					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass channel

Max. Release= 1,500 cfs)					
2.B.1 Pumping Plant(Q=1,500 cfs,TDH=23 ft,P=3.4 mw)	1	LS	\$9,000,000	\$9,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	18,900	CY	\$10	\$189,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	5,700	CY	\$5	\$29,000	
Dewatering		LS		\$1,000,000	
2.B.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	995,800	CY	\$8	\$7,966,000	
Riprap	94,100	TON	\$26	\$2,447,000	2.5-foot deep riprap layer
Bedding	19,300	CY	\$20	\$386,000	1-foot deep bedding layer
2.B.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.B.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wal
2.B.5 Control Building	400	SF	\$200	\$80,000	
2.B.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.B.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
2.C Bacon Island-Middle River, (Max. diversion = 1,500 cfs,					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass chann
Max. Release= 1,500 cfs)					
2.C.1 Pumping Plant(Q=1,500 cfs,TDH=24 ft,P=3.5 mw)	1	LS	\$10,000,000	\$10,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	24,700	CY	\$10	\$247,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	5,900	CY	\$5	\$30,000	
Dewatering		LS		\$1,000,000	
2.C.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	866,600	CY	\$8	\$6,933,000	
Riprap	92,600	TON	\$26	\$2,408,000	2.5-foot deep riprap layer
Bedding	19,100	CY	\$20	\$382,000	1-foot deep bedding layer
2.C.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.C.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wal
2.C.5 Control Building	400	SF	\$200	\$80,000	
2.C.6 Electrical Installation	1	JOB	\$100,000	\$100,000	

2.C.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
2.D Bacon Island-Santa Fe Cut, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass channel
2.D.1 Pumping Plant(Q=1,500 cfs,TDH=24 ft,P=3.5 mw)	1	LS	\$10,000,000	\$10,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	38,200	CY	\$10	\$382,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	12,400	CY	\$5	\$62,000	
Dewatering		LS		\$1,000,000	
2.D.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	608,800	CY	\$8	\$4,870,000	
Riprap	93,500	TON	\$26	\$2,431,000	2.5-foot deep riprap layer
Bedding	19,200	CY	\$20	\$384,000	1-foot deep bedding layer
2.D.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.D.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.D.5 Control Building	400	SF	\$200	\$80,000	
2.D.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.D.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass channel
SUBTOTAL INTEGRATED FACILITIES					\$104,733,000
3. FISH SCREENS					
3.1 Webb Tract-San Joaquin River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
3.2 Webb Tract-False River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
3.3 Bacon Island-Middle River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
3.4 Bacon Island-Santa Fe Cut: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
SUBTOTAL FISH SCREENS					\$60,000,000
4. LAND ACQUISITION					

	Bacon	5,450	AC	\$3,000	\$16,350,000	
	Webb	5,374	AC	\$3,000	\$16,122,000	
	Habitat Islands (Bouldin)	5,985	AC	\$3,000	\$17,955,000	
	Habitat Islands (Holland)	3,129	AC	\$3,000	\$9,387,000	
	SUBTOTAL LAND ACQUISITION					\$59,814,000
	5. ISLAND EMBANKMENTS					
	Bacon					
	Compacted Fill (includes a factor of 2.25)	4,400,000	CY	\$8	\$35,200,000	
	Riprap - Slough side (includes a factor of 1.2)	461,770	TON	\$26	\$12,006,000	
	Riprap - Reservoir side	260,000	TON	\$26	\$6,760,000	2.5-foot-deep riprap layer(quantity Source: Reclamation
	Bedding - Reservoir side	68,400	CY	\$20	\$1,368,000	1-foot-deep bedding layer
	Road Base(20' x 6")	53,000	TON	\$60	\$3,180,000	
	Clear and Grub	215	Acres	\$2,000	\$430,000	
	Piping Protection	260,000	CY	\$52	\$13,520,000	
	Webb					
	Compacted Fill (includes a factor of 2.25)	3,800,000	CY	\$8	\$30,400,000	
	Riprap - Slough side (includes a factor of 1.2)	764,800	TON	\$26	\$19,885,000	
	Riprap - Reservoir side	260,000	TON	\$26	\$6,760,000	2.5-foot-deep riprap layer(quantity Source: Reclamation
	Bedding - Reservoir side	67,500	CY	\$20	\$1,350,000	1-foot-deep bedding layer
	Road Base	48,000	TON	\$60	\$2,880,000	
	Clear and Grub	210	Acres	\$2,000	\$420,000	
	Piping Protection	200,000	CY	\$52	\$10,400,000	
	SUBTOTAL ISLAND EMBANKMENTS					\$144,559,000
	6. DEMOLITION, CLEANUP AND MISCELLANEOUS					
	Demolition and Cleanup		LS		\$100,000	
	Miscellaneous		LS		\$8,000,000	
	SUBTOTAL DEMOLITION, CLEANUP AND MISC.					\$8,100,000
	7. PERMITS		LS		\$300,000	\$300,000
	8. SEEPAGE CONTROL SYSTEM					
	Interceptor Wells	773	EA	\$10,000	\$7,730,000	20 gpm each, 150' apart, 0.5 HP, 6-stage turbine pump
	Monitoring Wells	117	EA	\$5,000	\$585,000	
	Electrical and Control Systems	773	EA	\$3,000	\$2,319,000	
	SUBTOTAL SEEPAGE					\$10,634,000
	9. INTERIOR WORK					

Earthwork Excavation around Structures	600,000	CY	\$4	\$2,400,000	
SUBTOTAL INTERIOR WORK					\$2,400,000
10. MITIGATION					
Habitat Islands Earthwork					
Habitat Development/Management					
Habitat Island Development and Construction, Fisheries					
Mitigation, Cultural Resources Mitigation, Project Construction					
Monitoring, Phase II Environmental Site Assessment					
SUBTOTAL MITIGATION			LS	\$21,000,000	\$21,000,000
SUBTOTAL				\$423,920,000	\$423,920,000
MOBILIZATION (5%)	1	LS		\$21,196,000	
CONTINGENCIES/UNLISTED ITEMS (20%)				84,784,000	
CONTRACT COST SUBTOTAL				\$529,900,000	
ENG., LEGAL, AND ADM. @ 25%				\$132,475,000	
TOTAL PROJECT COST				\$662,375,000	



TABLE 24B. RE-ENGINEERED DELTA WETLANDS
PROJECT: INTEGRATED FACILITIES ON WEBB TRACT AND
BACON ISLAND - ESTIMATE OF QUANTITIES AND COSTS
FOR 1,500 CFS DIVERSION/RELEASE AT EACH
INTEGRATED FACILITY (TOTAL = 6,000 CFS MAX)
(Slough-side slopes to be engineered to 4:1)

Item	Total Quantity	Units	Unit Price	Pricing	Notes & Comments
1. RELOCATIONS					
New Transmission Lines to Pumping Plants					
Webb Tract	6	MI	\$265,000	\$1,590,000	
Bacon Island	6	MI	\$265,000	\$1,590,000	
PG&E Relocation at Bacon Island		LS		\$9,200,000	
SUBTOTAL RELOCATIONS					\$12,380,000
2. INTEGRATED FACILITIES					
2.A Webb Tract- San Joaquin River, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)					
2.A.1 Pumping Plant(Q=1,500 cfs,TDH=23 ft,P=3.4 mw)	1	LS	\$9,000,000	\$9,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	21,700	CY	\$10	\$217,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	5,000	CY	\$5	\$25,000	
Dewatering		LS		\$1,000,000	
2.A.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	845,100	CY	\$15	\$12,677,000	
Riprap	98,000	TON	\$39	\$3,822,000	
Bedding	20,200	CY	\$20	\$404,000	
2.A.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.A.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.A.5 Control Building	400	SF	\$200	\$80,000	
2.A.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.A.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
2.B Webb Tract- False River, (Max. diversion = 1,500 cfs,					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass channel outlet

Max. Release= 1,500 cfs)					
2.B.1 Pumping Plant(Q=1,500 cfs,TDH=23 ft,P=3.4 mw)	1	LS	\$9,000,000	\$9,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	18,900	CY	\$10	\$189,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	5,700	CY	\$5	\$29,000	
Dewatering		LS		\$1,000,000	
2.B.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	995,800	CY	\$15	\$14,937,000	
Riprap	94,100	TON	\$39	\$3,670,000	
Bedding	19,300	CY	\$20	\$386,000	
2.B.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.B.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.B.5 Control Building	400	SF	\$200	\$80,000	
2.B.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.B.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
2.C Bacon Island-Middle River, (Max. diversion = 1,500 cfs,					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass channel outlet
Max. Release= 1,500 cfs)					
2.C.1 Pumping Plant(Q=1,500 cfs,TDH=24 ft,P=3.5 mw)	1	LS	\$10,000,000	\$10,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	24,700	CY	\$10	\$247,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	5,900	CY	\$5	\$30,000	
Dewatering		LS		\$1,000,000	
2.C.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	866,600	CY	\$15	\$12,999,000	
Riprap	92,600	TON	\$39	\$3,611,000	
Bedding	19,100	CY	\$20	\$382,000	
2.C.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.C.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF		\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.C.5 Control Building	400	SF	\$200	\$80,000	
2.C.6 Electrical Installation	1	JOB	\$100,000	\$100,000	

2.C.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
2.D Bacon Island-Santa Fe Cut, (Max. diversion = 1,500 cfs,					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass channel
Max. Release= 1,500 cfs)					outlet
2.D.1 Pumping Plant(Q=1,500 cfs,TDH=24 ft,P=3.5 mw)	1	LS	\$10,000,000	\$10,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	38,200	CY	\$10	\$382,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	12,400	CY	\$5	\$62,000	
Dewatering		LS		\$1,000,000	
2.D.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	608,800	CY	\$15	\$9,132,000	
Riprap	93,500	TON	\$39	\$3,647,000	
Bedding	19,200	CY	\$20	\$384,000	
2.D.3 Gated Structures - 2					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.D.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.D.5 Control Building	400	SF	\$200	\$80,000	
2.D.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.D.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12'x15'@6,000 lbs, 6 nos = 36,000 LBS, at gates
					12'x12'@3,000 lbs, 6 nos = 18,000 LBS,at conduit intake
					12'x12'@4,000 lbs,10 nos=40,000 LBS,at bypass channel
					outlet
SUBTOTAL INTEGRATED FACILITIES					\$132,864,000
3. FISH SCREENS					
3.1 Webb Tract-San Joaquin River: Screen, Deck, Sill,	1,500	CFS	\$10,000	\$15,000,000	
Mounting Hardware and Foundation Piles					
3.2 Webb Tract-False River: Screen, Deck, Sill,	1,500	CFS	\$10,000	\$15,000,000	
Mounting Hardware and Foundation Piles					
3.3 Bacon Island-Middle River: Screen, Deck, Sill,	1,500	CFS	\$10,000	\$15,000,000	
Mounting Hardware and Foundation Piles					
3.4 Bacon Island-Santa Fe Cut: Screen, Deck, Sill,	1,500	CFS	\$10,000	\$15,000,000	
Mounting Hardware and Foundation Piles					
SUBTOTAL FISH SCREENS					\$60,000,000

4. LAND ACQUISITION					
Bacon	5,450	AC	\$3,000	\$16,350,000	
Webb	5,374	AC	\$3,000	\$16,122,000	
Habitat Islands (Bouldin)	5,985	AC	\$3,000	\$17,955,000	
Habitat Islands (Holland)	3,129	AC	\$3,000	\$9,387,000	
SUBTOTAL LAND ACQUISITION					\$59,814,000
5. ISLAND EMBANKMENTS					
Bacon					
Compacted Fill (includes a factor of 2.25)	6,550,000	CY	\$15	\$98,250,000	
Riprap (2.5-foot thick)	575,000	TON	\$39	\$22,425,000	
Bedding (1.0-foot thick)	230,000	CY	\$20	\$4,600,000	
Road Base(20' x 6")	53,000	TON	\$60	\$3,180,000	
Clear and Grub	255	Acres	\$2,000	\$510,000	
Excavation	150,000	CY	\$10	\$1,500,000	
Piping Protection	260,000	CY	\$52	\$13,520,000	
Webb					
Compacted Fill (includes a factor of 2.25)	6,100,000	CY	\$15	\$91,500,000	
Riprap (2.5-ft thick)	550,000	TON	\$39	\$21,450,000	
Bedding (1.0-ft thick)	227,000	CY	\$20	\$4,540,000	
Road Base	48,000	TON	\$60	\$2,880,000	
Clear and Grub	250	Acres	\$2,000	\$500,000	
Excavation	125,000	CY	\$10	\$1,250,000	
Piping Protection	200,000	CY	\$52	\$10,400,000	
SUBTOTAL ISLAND EMBANKMENTS					\$276,505,000
6. DEMOLITION, CLEANUP AND MISCELLANEOUS					
Demolition and Cleanup		LS		\$100,000	
Miscellaneous		LS		\$8,000,000	
SUBTOTAL DEMOLITION, CLEANUP AND MISC.					\$8,100,000
7. PERMITS		LS		\$300,000	\$300,000
8. SEEPAGE CONTROL SYSTEM					

Interceptor Wells	773	EA	\$10,000	\$7,730,000	20 gpm each, 150' apart, 0.5 HP, 6-stage turbine pump
Monitoring Wells	117	EA	\$5,000	\$585,000	
Electrical and Control Systems	773	EA	\$3,000	\$2,319,000	
SUBTOTAL SEEPAGE					\$10,634,000
9. INTERIOR WORK					
Earthwork Excavation around Structures	600,000	CY	\$4	\$2,400,000	
SUBTOTAL INTERIOR WORK					\$2,400,000
10. MITIGATION					
Habitat Islands Mitigation		LS		\$21,000,000	
Reservoir Island Slough Side Slope Mitigation		LS		\$100,000,000	Mitigation is expected to be between \$100M and \$200M
SUBTOTAL MITIGATION					\$121,000,000
SUBTOTAL				\$683,997,000	\$683,997,000
MOBILIZATION (5%)	1	LS		\$34,200,000	
CONTINGENCIES/UNLISTED ITEMS (20%)				136,799,000	
CONTRACT COST SUBTOTAL				\$854,996,000	
ENG., LEGAL, AND ADM. @ 25%				\$213,749,000	
TOTAL PROJECT COST				\$1,068,745,000	

**TABLE 25. BACON ISLAND AND VICTORIA ISLAND OPTION
WITH CONNECTION TO CLIFTON COURT FOREBAY
ESTIMATED QUANTITIES AND COSTS FOR 1,500
CFS DIVERSION/RELEASE AT EACH INTEGRATED FACILITY
(TOTAL=6,000 CFS MAX)
Assumes Slough Side Slopes will be modified to 3:1.**

Item	Total Quantity	Units	Unit Price	Pricing	Notes & Comments
1. RELOCATIONS					
New Transmission Lines to Pumping Plants					
Victoria Island	3	MI	\$265,000	\$795,000	
Bacon Island	6	MI	\$265,000	\$1,590,000	
PG&E Relocation at Bacon Island		LS		\$9,200,000	
Raising of Highway 4 in Victoria Island					
8'Concrete Pipe	4,116	LF	\$700	\$2,881,000	
Compacted Fill	2,000,000	CY	\$8	\$16,000,000	
Riprap	1,077,300	TON	\$26	\$28,010,000	
Bedding	165,000	CY	\$20	\$3,300,000	
Geotextile	420,000	SY	\$2	\$840,000	
Asphaltic Concrete	3,700	CY	\$75	\$278,000	
Aggregate Base	8,000	CY	\$30	\$240,000	
SUBTOTAL RELOCATIONS					\$63,134,000
2. INTEGRATED FACILITIES					
2.A Victoria Island-Middle River, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)					
2.A.1 Pumping Plant(Q=1,500 cfs,TDH=20 ft,P=2.9 mw)	1	LS	\$8,000,000	\$8,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	22,700	CY	\$10	\$227,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	8,100	CY	\$5	\$41,000	
Dewatering		LS		\$1,000,000	
2.A.2 Structures Embankment					
Compacted Embankment (includes factor of 1.5)				\$3,443,000	Victoria Island has relatively less peat soil depth
Riprap	88,100	TON	\$26	\$2,291,000	factor of 1.5 is used. For sites with relatively more peat soil
Bedding	18,100	CY	\$20	\$362,000	depth a factor of 2.25 is used.

2.A.3 Gated Structures - 2							
Piles			3,000	LF	\$40	\$120,000	
Structural Concrete			4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility			6	EA	\$144,000	\$864,000	
2.A.4 Sheet Pile Separation Wall for Discharge Channel			25,200	SF	\$15	\$378,000	630 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.A.5 Control Building			400	SF	\$200	\$80,000	
2.A.6 Electrical Installation			1	JOB	\$100,000	\$100,000	
2.A.7 Misc Metalwork (Trash Racks)			94,000	LB	\$2	\$188,000	12' x 15' @ 6,000 lbs, 6 nos=36,000 lbs, at gates
2.B Victoria Island-Old River, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)							12'x12' @3,000 lbs,6 nos=18,000 lbs,at conduit intake/outlet
							12'x12'@4,000 lbs,10 nos=40,000 lbs,at bypass channel outlet
2.B.1 Pumping Plant(Q=1,500 cfs,TDH=20 ft,P=2.9 mw)			1		\$8,000,000	\$8,000,000	
Intake/Discharge Conduits and Miscellaneous				LS	\$2,000,000	\$2,000,000	
Excavation			31,100	CY	\$10	\$311,000	
Piles			4,300	LF	\$40	\$172,000	
Backfill			7,100	CY	\$5	\$36,000	
Dewatering				LS		\$1,000,000	
2.B.2 Structures Embankment							
Compacted Embankment (includes factor of 1.5)			556,500	CY	\$8	\$4,452,000	
Riprap			97,800	TON	\$26	\$2,543,000	
Bedding			20,000	CY	\$20	\$400,000	
2.B.3 Gated Structures - 2							
Piles			3,000	LF	\$40	\$120,000	
Structural Concrete			4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility			6	EA	\$144,000	\$864,000	
2.B.4 Sheet Pile Separation Wall for Discharge Channel			25,200	SF	\$15	\$378,000	630 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.B.5 Control Building			400	SF	\$200	\$80,000	
2.B.6 Electrical Installation			1	JOB	\$100,000	\$100,000	
2.B.7 Misc Metalwork (Trash Racks)			94,000	LB	\$2	\$188,000	12' x 15' @ 6,000 lbs, 6 nos=36,000 lbs, at gates
2.C Bacon Island-Middle River, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)							12'x12' @3,000 lbs,6 nos=18,000 lbs,at conduit intake/outlet
							12'x12'@4,000 lbs,10 nos=40,000 lbs,at bypass channel outlet
2.C.1 Pumping Plant(Q=1,500 cfs,TDH=24 ft,P=3.5 mw)			1	LS	\$10,000,000	\$10,000,000	
Intake/Discharge Conduits and Miscellaneous						\$2,000,000	
Excavation			24,700	CY	\$10	\$247,000	
Piles			4,300	LF	\$40	\$172,000	

	Backfill	5,900	CY	\$5	\$30,000	
	Dewatering		LS		\$1,000,000	
	2.C.2 Structures Embankment					
	Compacted Embankment (includes factor of 2.25)	866,600	CY	\$8	\$6,933,000	
	Riprap	92,600	TON	\$26	\$2,408,000	
	Bedding	19,100	CY	\$20	\$382,000	
	2.C.3 Gated Structures - 2					
	Piles	3,000	LF	\$40	\$120,000	
	Structural Concrete	4,000	CY	\$500	\$2,000,000	
	Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
	2.C.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wal
	2.C.5 Control Building	400	SF	\$200	\$80,000	
	2.C.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
	2.C.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12' x 15' @ 6,000 lbs, 6 nos=36,000 lbs, at gates
						12'x12' @3,000 lbs,6 nos=18,000 lbs,at conduit intake/or
	2.D Bacon Island-Santa Fe Cut, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)					12'x12'@4,000 lbs,10 nos=40,000 lbs,at bypass channel
						outlet
	2.D.1 Pumping Plant(Q=1,500 cfs,TDH=24 ft,P=3.5 mw)	1	LS	\$10,000,000	\$10,000,000	
	Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
	Excavation	38,200	CY	\$10	\$382,000	
	Piles	4,300	LF	\$40	\$172,000	
	Backfill	12,400	CY	\$5	\$62,000	
	Dewatering		LS		\$1,000,000	
	2.D.2 Structures Embankment					
	Compacted Embankment (includes factor of 2.25)	608,800	CY	\$8	\$4,870,000	
	Riprap	93,500	TON	\$26	\$2,431,000	
	Bedding	19,200	CY	\$20	\$384,000	
	2.D.3 Gated Structures - 2					
	Piles	3,000	LF	\$40	\$120,000	
	Structural Concrete	4,000	CY	\$500	\$2,000,000	
	Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
	2.D.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wal
	2.D.5 Control Building	400	SF	\$200	\$80,000	
	2.D.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
	2.D.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12' x 15' @ 6,000 lbs, 6 nos=36,000 lbs, at gates
						12'x12'@3,000 lbs,6 nos=18,000 lbs,at conduit intake/or
						12'x12' @4,000 lbs,10 nos=40,000 lbs,at bypass channe
						outlet
	SUBTOTAL INTEGRATED FACILITIES				\$95,855,000	

3. CONVEYANCE FACILITIES						
- (from Victoria Island to Clifton Court Forebay)						
3A. Pumping Plant - South Side of Victoria Island						
Pumping into Siphons and Channel						
3.A.1 Pumping Plant(Q=2,000 cfs,TDH=29 ft,P=5.6 mw)	1	EA	\$14,300,000	\$14,300,000		
Excavation	44,000	CY	\$10	\$440,000		
Piles	3,800	LF	\$40	\$152,000		
Backfill	34,000	CY	\$5	\$170,000		
Dewatering		LS		\$1,000,000		
3.A.2 Structures Embankment						
Compacted Embankment (includes a factor of 1.5)	131,400	CY	\$8	\$1,051,000		
Riprap	15,800	TON	\$26	\$411,000		
Bedding	3,100	CY	\$20	\$62,000		
3.A.3 Gated Structures - 4						
Piles	300	LF	\$40	\$12,000		
Structural Concrete	130	CY	\$500	\$65,000		
Vertical Slide gates (12x8)	4	EA	\$144,000	\$576,000		
3.A.4 Control Building	400	SF	\$200	\$80,000		
3.A.5 Electrical Installation	1	JOB	\$100,000	\$100,000		
3.A.6 Misc Metalwork (Trash Racks)	24,000	LB	\$2	\$48,000		
3B. Siphons (Under Old River and into Channel)						
Pipe (4 - 6' barrels), 4x700'=2,800', assume 3000'	3,000	LF	\$800	\$2,400,000		
Excavation	68,000	CY	\$10	\$680,000		
Backfill	55,500	CY	\$5	\$278,000		
Riprap	7,000	TON	\$26	\$182,000		
Bedding	1,400	CY	\$20	\$28,000		
Cofferdam Fill	73,750	CY	\$30	\$2,213,000		
Impervious Membrane	10,000	SY	\$2	\$20,000		
3C. Channel (conveyance from Siphons to Clifton Court FB)						
Compacted Fill (includes a factor of 1.5)	674,000	CY	\$8	\$5,392,000		
Riprap	221,600	TON	\$26	\$5,762,000		
Bedding	43,800	CY	\$20	\$876,000		
Outlet Culvert-CMP 12.5' dia-170' longx6 culverts	1,020	LF	\$600	\$612,000		
SUBTOTAL PUMPING PLANT, SIPHON and CHANNEL					\$36,910,000	
4. FISH SCREENS						
4.1 Webb Tract-San Joaquin River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000		

4.2 Webb Tract-False River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
4.3 Bacon Island-Middle River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
4.4 Bacon Island-Santa Fe Cut: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
SUBTOTAL FISH SCREENS					\$60,000,000
5. LAND ACQUISITION					
Bacon	5,450	AC	\$3,000	\$16,350,000	
Victoria	7,102	AC	\$3,000	\$21,306,000	
Habitat Islands (Bouldin)	5,985	AC	\$3,000	\$17,955,000	
Habitat Islands (Holland)	3,129	AC	\$3,000	\$9,387,000	
SUBTOTAL LAND ACQUISITION					\$64,998,000
6. ISLAND EMBANKMENTS					
6A. Bacon					
Compacted Fill (Includes a factor of 2.25)	4,400,000	CY	\$8	\$35,200,000	
Riprap - Slough Side (includes a factor of 1.2)	461,770	TON	\$26	\$12,006,000	
Riprap-Reservoir Side	260,000	TON	\$26	\$6,760,000	2.5-foot-deep riprap layer
Riprap Bedding-Reservoir Side	68,400	CY	\$20	\$1,368,000	1-foot-deep bedding layer
Road Base(20' x 6")	53,000	TON	\$60	\$3,180,000	
Clear and Grub	215	Acre	\$2,000	\$430,000	
Piping Protection	260,000	CY	\$52	\$13,520,000	
6B. Victoria					
Compacted Fill (Includes a factor of 1.5)	3,216,600	CY	\$8	\$25,733,000	Net volume, after subtracting island-side riprap and bedding
Riprap - Slough Side (includes a factor of 1.2)	818,400	TON	\$26	\$21,278,000	
Riprap-Reservoir Side	539,600	TON	\$26	\$14,030,000	2.5-foot-deep riprap layer
Riprap Bedding-Island Side	106,600	CY	\$20	\$2,132,000	1-foot-deep bedding layer
Road Base	55,000	TON	\$60	\$3,300,000	
Clear and Grub	215	Acre	\$2,000	\$430,000	
Piping Protection	253,000	CY	\$52	\$13,156,000	
SUBTOTAL ISLAND EMBANKMENTS					\$152,523,000
7. DEMOLITION, CLEANUP AND MISCELLANEOUS					
Demolition and Cleanup				\$100,000	
Miscellaneous		LS		\$8,000,000	\$8,100,000
SUBTOTAL DEMOLITION, CLEANUP AND MISC.					

8. PERMITS		LS		\$300,000	\$300,000
9. SEEPAGE CONTROL SYSTEM				\$5,000,000	
Bacon		LS			
Victoria		LS			
SUBTOTAL SEEPAGE					\$5,000,000
10. INTERIOR WORK					
Earthwork Excavation around Structures	600,000	CY	\$4	\$2,400,000	
SUBTOTAL INTERIOR WORK					\$2,400,000
11. MITIGATION					
Habitat Islands Earthwork					
Habitat Development/Management					
Habitat Island Development and Construction, Fisheries					
Mitigation, Cultural Resources Mitigation, Project Construction					
Monitoring, Phase II Environmental Site Assessment			LS	\$21,000,000	
SUBTOTAL MITIGATION					\$21,000,000
SUBTOTAL				\$510,220,000	\$510,220,000
MOBILIZATION (5%)	1	LS		\$25,511,000	
CONTINGENCIES/UNLISTED ITEMS (20%)				102,044,000	
CONTRACT COST SUBTOTAL				\$637,775,000	
ENG., LEGAL, AND ADM. @ 25%				\$159,444,000	
TOTAL PROJECT COST				\$797,219,000	

**TABLE 26. WEBB TRACT AND VICTORIA ISLAND OPTION
WITH CONNECTION TO CLIFTON COURT FOREBAY
ESTIMATED QUANTITIES AND COSTS FOR 1,500
CFS DIVERSION/RELEASE AT EACH INTEGRATED
FACILITY (TOTAL=6,000 CFS MAX)
Assumes Slough Side Slopes will be modified to 3:1.**

Item	Total Quantity	Units	Unit Price	Pricing	Notes & Comments
1. RELOCATIONS					
New Transmission Lines to Pumping Plants					
Victoria Island	3	MI	\$265,000	\$795,000	
Webb Tract	6	MI	\$265,000	\$1,590,000	
Raising of Highway 4 in Victoria Island					
Hwy 4 Raising					
8'Concrete Pipe	4,116	LF	\$700	\$2,881,000	
Compacted Fill	2,000,000	CY	\$8	\$16,000,000	
Riprap	1,077,300	TON	\$26	\$28,010,000	
Bedding	165,000	CY	\$20	\$3,300,000	
Geotextile	420,000	SY	\$2	\$840,000	
Asphaltic Concrete	3,700	CY	\$75	\$278,000	
Aggregate Base	8,000	CY	\$30	\$240,000	
SUBTOTAL RELOCATIONS					\$53,934,000
2. INTEGRATED FACILITIES					
2.A Victoria Island-Middle River, (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)					
2.A.1 Pumping Plant(Q=1,500 cfs,TDH=20 ft,P=2.9 mw)	1	LS	\$8,000,000	\$8,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	22,700	CY	\$10	\$227,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	8,100	CY	\$5	\$41,000	
Dewatering		LS		\$1,000,000	
2.A.2 Structures Embankment					
Compacted Embankment (includes factor of 1.5)	430,400	CY	\$8	\$3,443,000	

	Riprap	97,800	TON	\$26	\$2,543,000	
	Bedding	20,000	CY	\$20	\$400,000	
	2.B.3 Gated Structures - 4					
	Piles	3,000	LF	\$40	\$120,000	
	Structural Concrete	4,000	CY	\$500	\$2,000,000	
	Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
	2.B.4 Sheet Pile Separation Wall for Discharge Channel	25,200	SF	\$15	\$378,000	630 ft long x 20 ft high with 20 ft in-ground sheet pile wall
	2.B.5 Control Building	400	SF	\$200	\$80,000	
	2.B.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
	2.B.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12' x 15' @ 6,000 lbs, 6 nos=36,000 lbs, at gates
						12'x12' @3,000 lbs,6 nos=18,000 lbs,at conduit intake/outlet
						12'x12'@4,000 lbs,10 nos=40,000 lbs,at bypass channel outlet
	2.C Webb Tract-San Joaquin River,(Max.diversion=1,500 cfs, Max. Release= 1,500 cfs)					
	2.C.1 Pumping Plant(Q=1,500 cfs,TDH=23 ft,P=3.4 mw)	1	LS	\$9,000,000	\$9,000,000	
	Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
	Excavation	21,700	CY	\$10	\$217,000	
	Piles	4,300	LF	\$40	\$172,000	
	Backfill	5,000	CY	\$5	\$25,000	
	Dewatering		LS		\$1,000,000	
	2.C.2 Structures Embankment					
	Compacted Embankment (includes factor of 2.25)	845,100	CY	\$8	\$6,761,000	
	Riprap	98,000	TON	\$26	\$2,548,000	
	Bedding	20,200	CY	\$20	\$404,000	
	2.C.3 Gated Structures - 4					
	Piles	3,000	LF	\$40	\$120,000	
	Structural Concrete	4,000	CY	\$500	\$2,000,000	

Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.C.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.C.5 Control Building	400	SF	\$200	\$80,000	
2.C.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.C.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12' x 15' @ 6,000 lbs, 6 nos=36,000 lbs, at gates
					12'x12' @3,000 lbs,6 nos=18,000 lbs,at conduit intake/outlet
					12'x12'@4,000 lbs,10 nos=40,000 lbs,at bypass channel outlet
2.D Webb Tract-False River (Max. diversion = 1,500 cfs, Max. Release= 1,500 cfs)					
2.D.1 Pumping Plant(Q=1,500 cfs,TDH=23 ft,P=3.4 mw)	1	LS	\$9,000,000	\$9,000,000	
Intake/Discharge Conduits and Miscellaneous		LS	\$2,000,000	\$2,000,000	
Excavation	18,900	CY	\$10	\$189,000	
Piles	4,300	LF	\$40	\$172,000	
Backfill	5,700	CY	\$5	\$29,000	
Dewatering		LS		\$1,000,000	
2.D.2 Structures Embankment					
Compacted Embankment (includes factor of 2.25)	995,800	CY	\$8	\$7,966,000	
Riprap	94,100	TON	\$26	\$2,447,000	
Bedding	19,300	CY	\$20	\$386,000	
2.D.3 Gated Structures - 4					
Piles	3,000	LF	\$40	\$120,000	
Structural Concrete	4,000	CY	\$500	\$2,000,000	
Vertical Slide gates (12x8) - 6 nos per facility	6	EA	\$144,000	\$864,000	
2.D.4 Sheet Pile Separation Wall for Discharge Channel	25,600	SF	\$15	\$384,000	640 ft long x 20 ft high with 20 ft in-ground sheet pile wall
2.D.5 Control Building	400	SF	\$200	\$80,000	
2.D.6 Electrical Installation	1	JOB	\$100,000	\$100,000	
2.D.7 Misc Metalwork (Trash Racks)	94,000	LB	\$2	\$188,000	12' x 15' @ 6,000 lbs, 6 nos=36,000 lbs, at gates
					12'x12' @3,000 lbs,6 nos=18,000 lbs,at conduit intake/outlet
					12'x12'@4,000 lbs,10 nos=40,000 lbs,at bypass channel outlet
SUBTOTAL INTEGRATED FACILITIES				\$96,698,000	
3. CONVEYANCE FACILITIES					
- (from Victoria Island to Clifton Court Forebay)					
3A. Pumping Plant - South Side of Victoria Island					
Pumping into Siphons and Channel					
3.A.1 Pumping Plant(Q=2,000 cfs,TDH=29 ft,P=5.6 mw)				\$14,300,000	
Excavation	44,000	CY	\$10	\$440,000	

Piles	3,800	LF	\$40	\$152,000	
Backfill	34,000	CY	\$5	\$170,000	
Dewatering		LS		\$1,000,000	
3.A.2 Structures Embankment					
Compacted Embankment (includes factor of 1.5)	131,400	CY	\$8	\$1,051,000	
Riprap	15,800	TON	\$26	\$411,000	
Bedding	3,100	CY	\$20	\$62,000	
3.A.3 Gated Structures - 4					
Piles	300	LF	\$40	\$12,000	
Structural Concrete	130	CY	\$500	\$65,000	
Vertical Slide gates (12x8)	4	EA	\$144,000	\$576,000	
3.A.4 Control Building	400	SF	\$200	\$80,000	
3.A.5 Electrical Installation	1	JOB	\$100,000	\$100,000	
3.A.6 Misc Metalwork (Trash Racks)	24,000	LB	\$2	\$48,000	
3B. Siphons (Under Old River and into Channel)					
Pipe (4 - 6' barrels), 4x700'=2,800', assume 3000'	3,000	LF	\$800	\$2,400,000	
Excavation	68,000	CY	\$10	\$680,000	
Backfill	55,500	CY	\$5	\$278,000	
Riprap	7,000	TON	\$26	\$182,000	
Bedding	1,400	CY	\$20	\$28,000	
Cofferdam Fill	73,750	CY	\$30	\$2,213,000	
Impervious Membrane	10,000	SY	\$2	\$20,000	
3C. Channel (conveyance from Siphons to Clifton Court FB)					
Compacted Fill (Incl. Factor=1.5)	674,000	CY	\$8	\$5,392,000	
Riprap	221,600	TON	\$26	\$5,762,000	
Bedding	43,800	CY	\$20	\$876,000	
Outlet Culvert-CMP 12.5' dia-170' longx6 culverts	1,020	LF	\$600	\$612,000	
SUBTOTAL PUMPING PLANT, SIPHON and CHANNEL					\$36,910,000
4. FISH SCREENS					
4.1 Webb Tract-San Joaquin River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
4.2 Webb Tract-False River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
4.3 Bacon Island-Middle River: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	
4.4 Bacon Island-Santa Fe Cut: Screen, Deck, Sill, Mounting Hardware and Foundation Piles	1,500	CFS	\$10,000	\$15,000,000	

SUBTOTAL FISH SCREENS					\$60,000,000	
5. LAND ACQUISITION						
Webb	5,374	AC	\$3,000	\$16,122,000		
Victoria	7,102	AC	\$3,000	\$21,306,000		
Habitat Islands (Bouldin)	5,985	AC	\$3,000	\$17,955,000		
Habitat Islands (Holland)	3,129	AC	\$3,000	\$9,387,000		
SUBTOTAL LAND ACQUISITION					\$64,770,000	
6. ISLAND EMBANKMENTS						
6A. Webb						
Compacted Fill (Includes a factor of 2.25)	3,800,000	CY	\$8	\$30,400,000		
Riprap - Slough Side (includes a factor of 1.2)	764,800	TON	\$26	\$19,885,000		
Riprap-Reservoir Side	260,000	TON	\$26	\$6,760,000	2.5-foot-deep riprap layer (quantity source:Reclamation 4/17/02)	
Bedding-Reservoir Side	67,500	CY	\$20	\$1,350,000	1-foot-deep bedding layer	
Road Base(20' x 6")	48,000	TON	\$60	\$2,880,000		
Clear and Grub	210	Acres	\$2,000	\$420,000		
Piping Protection	200,000	CY	\$52	\$10,400,000		
6B. Victoria						
Compacted Fill (Includes a factor of 1.5)	3,216,600	CY	\$8	\$25,733,000	Net volume, after subtracting island-side riprap and bedding	
Riprap - Slough Side (includes a factor of 1.2)	818,400	TON	\$26	\$21,278,000		
Riprap-Reservoir Side	539,600	TON	\$26	\$14,030,000	2.5-foot-deep riprap layer	
Riprap Bedding-Island Side	106,600	CY	\$20	\$2,132,000	1-foot-deep bedding layer	
Road Base	55,000	TON	\$60	\$3,300,000		
Clear and Grub	215	Acre	\$2,000	\$430,000		
Piping Protection	253,000	CY	\$52	\$13,156,000		
SUBTOTAL ISLAND EMBANKMENTS					\$152,154,000	
7. DEMOLITION, CLEANUP AND MISCELLANEOUS						
Demolition and Cleanup		LS		\$100,000		
Miscellaneous		LS		\$8,000,000	\$8,100,000	
8. PERMITS						
		LS		\$300,000	\$300,000	
9. SEEPAGE CONTROL SYSTEM						
Webb		LS				
Victoria		LS		\$5,000,000		

SUBTOTAL SEEPAGE			\$5,000,000
10. INTERIOR WORK			
Earthwork Excavation around Structures	600,000	CY	\$4
SUBTOTAL INTERIOR WORK			\$2,400,000
11. MITIGATION			
Habitat Islands Earthwork			
Habitat Development/Management			
Habitat Island Development and Construction, Fisheries			
Mitigation, Cultural Resources Mitigation, Project			
Construction			
Monitoring, Phase II Environmental Site Assessment		LS	\$21,000,000
SUBTOTAL MITIGATION			\$21,000,000
SUBTOTAL			\$501,266,000
MOBILIZATION (5%)			\$25,063,000
CONTINGENCIES/UNLISTED ITEMS (20%)			100,253,000
CONTRACT COST SUBTOTAL			\$626,582,000
ENG., LEGAL, AND ADM. @ 25%			\$156,646,000
TOTAL PROJECT COST			\$783,228,000